We claim:

1. In a system of at least first and second nodes for sending data on a shared serial data path, each using dominant and recessive signals to encode bit values, each said node having a send register recording the bits of a message to be sent, and a message-sending module responsive to a send signal, sending on the data path during successive bit intervals the signal values specified by bit values in sequential bit positions of the send register, where a dominant signal level sent on the data path by any node during a bit interval creates a dominant signal level on the data path during that bit interval irrespective of the number of recessive signal levels sent by other nodes, wherein each node while sending senses the signal level on the data path during each bit interval, and if the sensed signal level differs from that sent by that node, halts further sending of signal levels by that node, wherein each of at least first and second nodes generates a data signal associated with that node and encoding a node data value, said system including a report query module providing a report query message signal to each of the first and second nodes, said report query message signal encoding a query data field having a value specifying a report message header value;

and wherein the at least first and second nodes each include:

i) a message assembly register for receiving bit patterns;

ii) a message-generating module receiving the report query message signal and the associated data signal and forming therefrom in the message assembly register a report message having as leading bits thereof a report message header specified by the query data field in the report query message signal, each of the at least first and second nodes providing an identical report message header responsive to a particular query data

field value, and as low order bits thereof a series of bits encoding the node data value in the data signal generated by the node involved;

iii) a message-synchronizing module providing a synchronizing signal on the data path; and

iv) a message selection module copying a message assembled in the message assembly register into the send register, and responsive to the synchronizing signal, providing the send signal to the message-sending module.

2. The system of claim 1, further comprising in each of the at least first and second nodes a memory for holding a query response list having a plurality of entries, each entry including a query data field value in association with a report message header value, and wherein the message-generating module further includes an element receiving the report query message signal and searching the query response list for a query data field value equaling the query data field value encoded in the report query message signal, and forming a report message in the message assembly register having the report message header associated in the query response list with the query data field value encoded in the report query message signal.

3. The system of claim 2, further comprising in each of the at least first and second nodes a memory for holding a send message queue having a plurality of messages, and wherein the message generating module in each of the first and second nodes stores in the send message queue the contents of the message assembly register upon forming a report message therein, and wherein the message selection module selects

individual messages from the send message queue, copies selected messages into the send register, and responsive to a synchronizing signal occurring thereafter, provides the send signal to the message sending module

4. The system of claim 3, wherein each message selection module includes an element employing arbitration-based message selection to select messages to copy into the send register.

5. The system of claim 4 wherein each element employing arbitration-based message selection selects messages in the send message queue whose numeric value is largest when all of the messages in the send message queue are treated as numeric values.

6. The system of claim 4 wherein each element employing arbitration-based message selection selects messages in the send message queue whose numeric value is smallest when all of the messages in the send message queue are treated as numeric values.

7. The system of claim 3, further comprising in each of the at least first and second nodes a message-receiving module receiving the signal levels on the data path and from them forming individual incoming bit values, from the incoming bit values detecting the end of each message, and responsive to detecting the end of a message, providing the synchronizing signal.

8. The system of claim 7, further comprising in each of the at least first and second nodes an incoming message register having a plurality of sequential bit locations, and wherein the message-receiving module further comprises elements

a) recording sequential incoming bit values in sequential bit locations of the incoming message register; and

b) determining whether the message in the incoming message register is a report message, and if a report message, comparing the report message header portion of the message in the incoming message register with the report message header portion in the send register, and if the two header portions are equal, deleting the message in the send message queue that was copied into the send register.

9. The system of claim 1, wherein each message-synchronizing module comprises an end-of-message detector in electrical connection to the data path and providing the synchronizing signal responsive to the end of each message.

10. A method for operating a system of at least first and second nodes for sending data on a shared serial data path, each using dominant and recessive signals to encode bit values, each said node having a send register recording the bits of a message to be sent, and a message-sending module responsive to a send signal, sending on the data path during successive bit intervals the signal values specified by bit values in sequential bit positions of the send register, where a dominant signal level sent on the data path by any node during a bit interval creates a dominant signal level on the data path during that bit interval irrespective of the number of recessive signal levels sent by other nodes, wherein

each node while sending senses the signal level on the data path during each bit interval, and if the sensed signal level differs from that sent by that node, halts further sending of signal levels by that node, wherein each of at least first and second nodes generates a data signal associated with that node and encoding a node data value, said system including a report query module providing a report query message signal to each of the first and second nodes, said report query message signal encoding a query data field having a value specifying a report message header value;

and wherein the at least first and second nodes each perform the steps of:

i) receiving the report query message signal and the associated data signal and forming therefrom in a message assembly register a report message having as leading bits thereof a report message header specified by the query data field in the report query message signal, each of the at least first and second nodes providing an identical report message header responsive to a particular query data field value, and as low order bits thereof a series of bits encoding the node data value in the data signal generated by the node involved;

ii) providing a synchronizing signal on the data path; and

iii) copying a message assembled in the message assembly register into the send register, and responsive to the synchronizing signal, providing the send signal to the message-sending module.

11. The method of claim 10, further comprising in each of the at least first and second nodes the steps of

a) recording a query response list having a plurality of entries, each entry including a query data field value in association with a report message header value;

b) receiving the report query message signal;

c) searching the query response list for a query data field value equaling the query data field value encoded in the report query message signal; and

d) forming a report message in the message assembly register having the report message header associated in the query response list with the query data field value encoded in the report query message signal.

12. The method of claim 11, further comprising in each of the at least first and second nodes the steps of

e) storing in a send message queue the contents of the message assembly register upon forming a report message therein;

f) copying selected messages from the send message queue into the send register; and

g) responsive to a synchronizing signal occurring thereafter, providing the send signal to the message sending module.

13. The method of claim 12, including in each of the at least first and second nodes, the step of selecting messages to copy into the send register using an arbitration-based message selection criterion.

14. The method of claim 13 wherein the arbitration-based message selection step includes selecting messages in the send message queue whose numeric value is largest when all of the messages in the send message queue are treated as numeric values.

15. The method of claim 13 wherein the arbitration-based message selection step includes selecting messages in the send message queue whose numeric value is smallest when all of the messages in the send message queue are treated as numeric values.

16. The method of claim 12, further comprising in each of the at least first and second nodes the steps of receiving the signal levels on the data path and from them forming individual incoming bit values, from the incoming bit values detecting the end of each message, and responsive to detecting the end of a message, providing the synchronizing signal.

17. The method of claim 12, further comprising in each of the at least first and second nodes the steps of

h) recording sequential incoming bit values in sequential bit locations of an incoming message register; and

i) testing whether the message in the incoming message register is a report message, and if a report message, comparing the report message header portion of the message in the incoming message register with the report message header portion in the send register, and if the two header portions are equal, deleting the message in the send message queue that was last copied into the send register.